



# How to Perform Your Atmosphere Investigation



## Study Site for the Investigation

Locate the Atmosphere Study Site on or near your school grounds so students can have daily access to them. The precipitation measurements should be taken within 100 meters of the soil moisture measurements described in the Soil Investigation.

### Cloud Observation

Measurements of cloud amount and cloud type require an unobstructed view of the sky. The middle of a sports field would be an excellent location. The site where you take your cloud measurements does not have to be in the exact location of your rain gauge and thermometers. To pick a good spot from which to take cloud measurements, simply walk around your school until you come to an area where you have the most unobstructed view of the sky.

If you live in a city, you may not be able to find a completely unobstructed view of the sky. To test whether the site you pick is a good one, ask yourself what would happen if the parts of the sky you cannot see were completely cloud covered or completely clear. Would this make a difference in the measurements you report? A site is satisfactory if a small portion of the sky is blocked, as long as that portion would not change the measurements you report.

## Instrument Placement

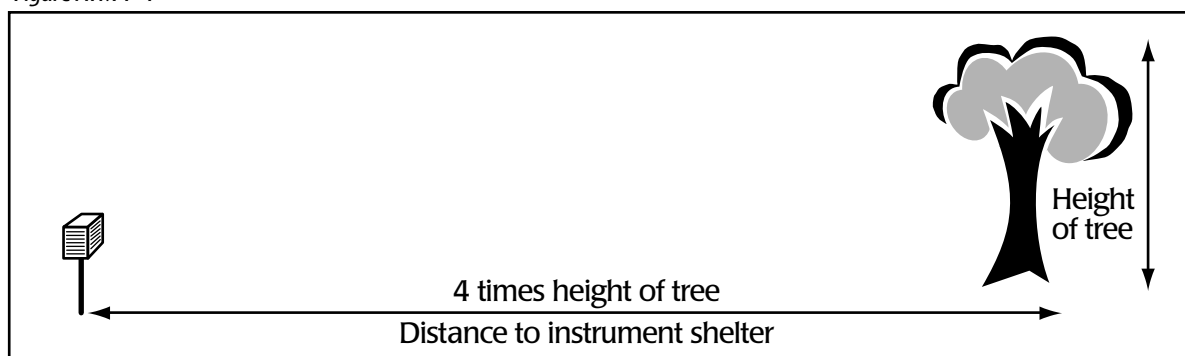
The ideal placement for both the rain gauge (and/or snowboard) and the instrument shelter, which will house the thermometers, is a flat, open area with a natural (e.g., grassy) surface. Avoid building roofs and paved or concrete surfaces if at all possible; these can become hotter than a grassy surface and affect temperature readings. Hard surfaces can cause errors in precipitation measurements due to splash-in. Also avoid placing the instruments on steep slopes or in sheltered hollows unless such terrain represents the surrounding area.

Do not place the rain gauge and instrument shelter close to buildings, trees, or high bushes. Nearby objects can block the flow of air to the thermometers and affect the amount of rain that collects in the rain gauge.

Ideally the rain gauge and the instrument shelter should be placed four times as far from an object as that object is high. For example, if your site is surrounded by trees or buildings that are 10 meters tall, place your instruments at least 40 meters from these trees. See Figure ATM-P-1. At such distances, trees, bushes, or buildings can break the wind and actually make your rainfall readings more accurate.

The instruments may be placed on a single post with the rain gauge on the opposite side from the shelter and above it, so that the instrument shelter

Figure ATM-P-1



does not block rain from collecting in the rain gauge. However, wind is one of the greatest contributors to errors in rain gauge measurements (wind blowing across the top of the gauge creates an effect that causes raindrops to be deflected around the gauge), and where possible, it is best to place the gauge as low to the ground as practical. This requires that the rain gauge be mounted on a separate post 3 to 4 meters away from the instrument shelter so that the instrument shelter does not block rain from collecting in the gauge. The instrument shelter should be mounted on the side of the post away from the Equator (i.e. on the north side in the Northern Hemisphere and on the south side in the Southern Hemisphere).

Your students should draw a map of the locations of the instruments. Include their placement relative to nearby buildings, trees, and shrubs using north-south coordinates as well as their distances to these objects. Also note the type of surface on which the instruments are placed. If it was not possible to locate your instruments as far from buildings, trees, or shrubs as requested or if the area around the instrument shelter is not a grassy natural surface, information about the relative locations of possible obstructions and about the surface material should be reported to the GLOBE Student Data Server as part of defining your Atmosphere Study Site.

### **Snowboard Placement**

Place the snowboard on relatively level ground where the snow depth best represents the average depth of the surrounding area. For a hillside, use the slope with an exposure away from the sun (this means a northerly exposure in the northern hemisphere and a southerly exposure in the southern hemisphere). The site should be free from trees, buildings and other obstructions that may affect wind flow or the melting of snow.

## **Determine Location**

Once you have chosen the site for the instruments, determine its coordinates with the GPS receiver and submit your findings to the GLOBE Student Data Server.

There maybe no such thing as an ideal location for the atmospheric instruments on your school grounds. In this case, make every effort to place the instruments in as good a location as possible, and report all derivations from the specified ideal (e.g. only 20 m away from 30 m tall trees, instrument shelter is set up over asphalt).

Note: Some schools may prefer to use automated instruments to measure temperature. Information about the instruments used must be reported to the GLOBE Student Data Server as part of defining your Atmosphere Study Site. Automated instruments require periodic recalibration. If your school uses an automated instrument, you must check its accuracy monthly by comparing it to the readings produced by an instrument which meets the GLOBE Instrument Specifications and which is located as close as possible to the sensors of your automated system.